Analysis of MANET routing Protocols Using Random waypoint Model in DSR

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Abstract

Ad hoc Network (MANET) was formed without any existing network, It's allocated dynamically .based on the network model nodes are generated dynamically . In Random Waypoint Model, transmitting the data from source to destination in multiple ways to require a available path between source node to destination node. A node that includes pause times between changes in destination and speed. A node begins with a point in one location for a certain period of time. The route can be selected as randomly. If the route is not available on selected path ,node is choose the available path. Every node have the available path ,when the node is start. each and every node randomly choose the path and reach the destination certain period of time. in this analysis is to perform the better transmission over the dynamic network topology. and also evaluate the better response over the Non Random based method(Not reserved nodes in dynamic network).the existing problem of network is route maintenance and traffic problems. The random waypoint network in DSR protocol rectify the routing problems and transmission delay.

Keywords :

MANET,speed ,Mobility,Topology,dynamic network, delay

1. Introduction

1.1 Random Waypoint Model

The Random waypoint model is a random-based method, it was applied any random communication systems. The mobility model is designed to describe the movement pattern of random nodes, and how their location, velocity and acceleration change over time. The mobility models were implemented o for simulation. Selecting the nodes from source to destination nodes are selected randomly at selected speed. It's was designed many simulation proposes. Two variants, the Random walk model and the Random direction model are variants of the Random waypoint model

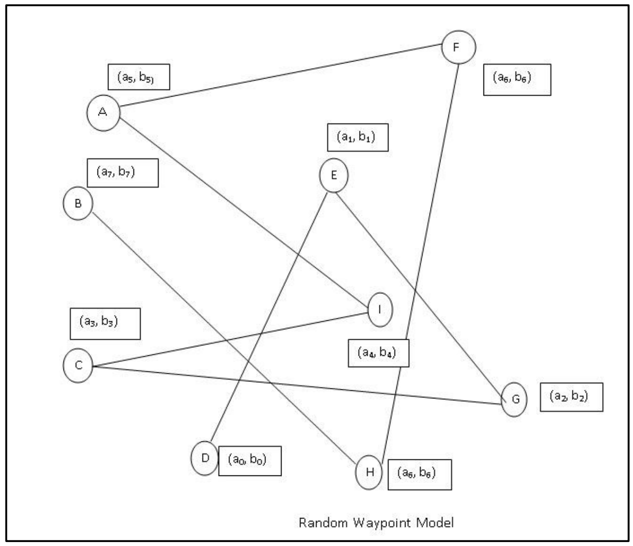

Fig: 1.1 Random Waypoint Model

The implementation of this mobility model is as follows as starts, each node randomly selects one location in the simulation field as the destination. The initial value of the root node is [0, V], here V is the maximum velocity of the each node. The velocity can be taken as independently of the each node. Travel the nodes maintain by the time interval i.e. T. it the T value is set to be Zero, it's happen continues changes. Each and every node has the velocity and speed, time period. Nodes are moved randomly in a network. These whole processes is repeated the simulation process until the data reached the destination

In the RWPM model, there are two parameters are indicated i.e. V and T. it describes the mobility of the each nodes if the velocity is less and the pause time is high, the adhoc network is stable. If the nodes are rotate very fast, the topology is to be dynamic. Camper of the T, V based on the time velocity can be changed with respect to each mobility of the node.

2. Literature Survey

2.1 The entitle of the paper"**Approximation Algorithms for a Link Scheduling Problem in Wireless Relay Networks with QoS Guarantee"** is describe how the links are failed in the reliable network. And also derive the algorithms for better performance of the link scheduling. Different factors are evaluate the in the link scheduling problems, these are throughput, transfer rate, delay

2.2 The entitle of the paper" **Distributed Multilevel Hierarchic Strategy for Broadcast Collaborative Mobile Networks"** how the data is transferred in broadcast mechanism in multiple ways.

2.3 The entitle of the paper"Efficient **Load-Aware Routing Scheme for Wireless Mesh Networks"** it describe load and efficiency of the network and also maintain the expected time for reached data.

2.4 The entitle of the paper" **Integrity Regions: Authentication through Presence in Wireless Networks"** In this paper, introduce Integrity (I) regions, a novel security primitive that enables message authentication in wireless networks without the use of pre established or pre certified keys. Integrity regions are based on the verification of entity proximity through time-of-arrival ranging techniques.

2.5 The entitle of the paper" **A Distributed and Scalable Time Slot Allocation Protocol for Wireless Sensor Networks"** it introduce a distributed and scalable scheduling access scheme that mitigates high data loss in data-intensive sensor networks and can also handle some mobility. The results demonstrate that our technique can efficiently handle sensor mobility with acceptable data loss, low packet delay, and low overhead.

3. Methodologies

The following methodologies are implemented for Random Networks

- Random Based Method
- Non Random Based Method
- Comparison Chart

3.1 Random Based Method

we are going to transfer the same file from source to destination through intermediate node, before transmission we going give route request to all the node and find the corresponding route path for all the node and store it into database, then transfer the file from source to destination through the corresponding route path present in a table and calculate the delay

the intermediate nodes dedicate their processing time only to the source which reserved the route; however, reservation of a multi hop route does not give any node an exclusive access to the shared radio channel (in terms of frequency bands, time slots, or spreading codes).

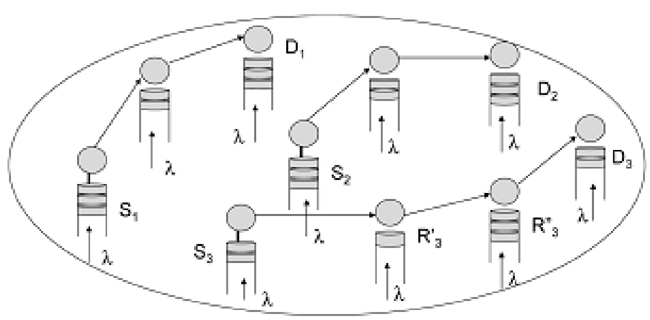

Fig 3.1 Random Based

3.2 Non Random Based Method

In the NRBM files are transferred by using center node. In this process nodes are not reserved. In particular, a node can serve as a relay node for more than one route. In other words, when a node receives a message from another node (i.e., it acts as a relay), it places that message in its own queue (intermingled with its own generated messages). The messages in the queue are transmitted sequentially (i.e., the priority given to relay and new locally generated messages is the same). An example of routes in a network with a Non Random Based scheme is shown in Fig. 4.2 As in the case of Random Based Method; we assume that the message generation process is Poisson and that the message length is exponentially distributed with average value.

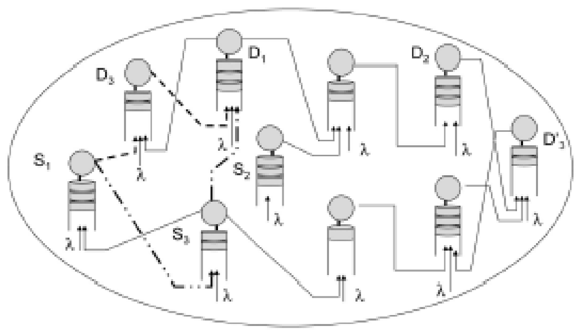

Fig 3.2 Non Random Based

3.3 Comparison Chart:

In this process, going to show performance chart for two different types of routing and this will prove random based is better performance than non random based routing.

4. Analysis of Random Based Method

4.1 Route Map

The route map is best solution of sending the data from source to destination. It discovery the route by request. And also maintain the cache table for maintain the routs.

4.2 Route Maintenance

Route Maintenance, it checks the whether the packets are sent success fully are not. Each node forwarding the route error removes from its cache the routes containing the broken link.

4.3 Route Updating

Route was updated by the cache table

4.4 Message Transmission

The message transmission is full duplex mode.

4.5 Delay

Each node is modeled as an M/G/1 queue. The average delay that each message experiences is equal to the sum of the mean waiting time in the source queue, denoted as E [W_O^{RB}] and the mean service time E [T_{RB}] where, as previously defined, $T_{RB} = W^{RB}_V + T^{RB}_S$ s. The mean waiting time in an M/G/1queue can be computed using the Pollaczeck- Khinchin formula :

$$E[W_O^{RB}] = \frac{\lambda_m E[\tau_{RB}^2]}{2(1-\lambda E[\tau_{RB}])_M}$$

4.6 Good put

The good put is the total amount of bits received correctly per unit time at their respective destinations. Route good put pertains to the amount of data transported correctly over time on single multi hop route with an average number of hops. Network good put, on the other hand, is the aggregate amount of good put due to all routes. It measures how much error-free data can collectively be transferred in a network over time. Route good put, denoted as β, and network good put, denoted as ή, can be written as follows, respectively:

$$\beta = \lambda_m \overline{L}_m (1 - BER_{route})$$

$$\eta = \beta E[N_{ar}]$$

Where $E[N_{ar}]$ is the expected number of active routes. The expected number of active routes is equal to the expected number of "busy servers" in an M/M/Cs queuing model, which, in this case, is equal to $\dfrac{N\lambda_m}{R_{rb}/\overline{L}_m}$

4.7 Throughput

In order to capture the effects of packet retransmission according to the imposed QoS on link PER , we use throughput instead of goodput. Throughput measures the rate at which a packet is received at its destination. In the case of no retransmission, the rate at which the packets are delivered to the destination is equal to the packet generation rate λ_p (dimension: [pck/s]). In the case of retransmissions, the throughput decreases because multiple copies of the same packet are transmitted.

5. Analysis of Non Random Based Method

5.1 Average Number of Routes per Node

In an NRB scheme, a node can relay traffic generated by multiple sources. However, the stability condition requires that the total incoming traffic rate is lower than the service rate. Consequently, it is important to know how much traffic a node carries for other sources. With the uniform traffic assumption (i.e., every node generates approximately the same amount of traffic), in order to compute the average traffic relayed by a node, it is sufficient to compute the average number of routes passing through it. In this section, we derive an expression for this number. Considering a grid topology as shown in Fig. 5.1, we want to find the average number of routes passing through a generic node, say, node V. We start by finding the probability that node V belongs to a route of a particular source/destination pair. Let Si,j be a source node at position (i,j) relative to the position of a node V, where I is the number of hops in the horizontal direction and j is the number of hops in the vertical direction. Due to the spatial invariance on a torus, one can assume, without loss of generality, that the source is at the origin and node V is at position (i,j) relative to the grid shape.

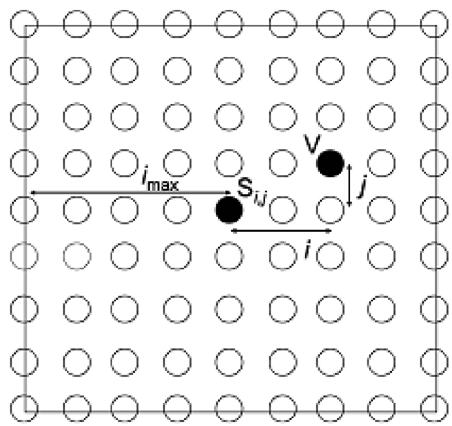

Fig No: 5.1 —Node V represents a possible relay node for source

position (i,j) relative to the source, as its destination. In addition, it is assumed that the shortest route between source and destination is used. In the case that there is more than one shortest route, a source selects one of these routes randomly. For conciseness, let us denote the probability that node V is on a route of Si,j as $P[V(i,j)]$, and let us denote the conditional probability that V is on a route of Si,j, given that Si,j selects a destination at P[V(i.j)/D(x,y)] With these assumptions, one obtains

$$P[V(i.j)/D(x,y)] = \begin{cases} 0 & x < i or y > j \\ \frac{\eta_p}{\eta t} & otherwise \end{cases}$$

5.2 Delay

Since each source does not have a dedicated route, a message transmitted in a route will experience, in addition to the transmission delay, a queuing delay at each node it traverses. According to the assumptions in Section 4.2 (in particular, the applicability of Burke's theorem to an NRB switching network [1]), the average delay that a packet experiences at each node it traverses corresponds to that of an M/M/1 queue and is given by

$$E\left[T^{NRB}\right]=\frac{1}{\frac{R_b}{L_m}-\lambda_{Total}}$$

5.3 Goodput

Route goodput and network goodput of an NRB switching network can be computed in the same manner as that of an RB scheme. Note that, in the calculation of route goodput, the amount of traffic should correspond to that generated only by source nodes (i.e., excluding the relay traffic). Since there are N sources, the network goodput of an NRB network can then be written as

$$\eta = \lambda_m \overline{L}_m \left(1 - BER_{route}\right)N$$

5.4 Throughput

The throughput of an NRB scheme can be computed in the same manner as in the case of an RB scheme.

6. Experimental Results

6.1 Random Nodes Selection

The following picture defines how the nodes are selected in the random way point Network processes. every node has associated with node information.

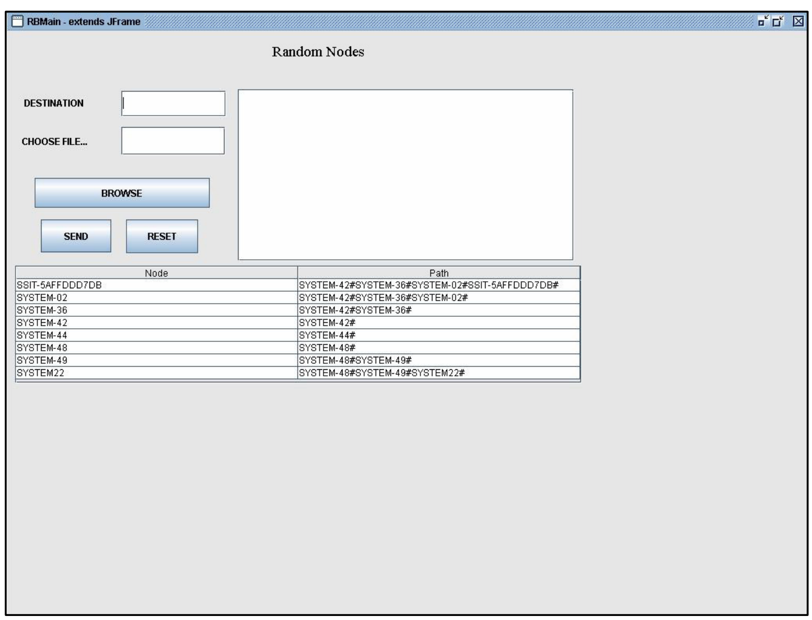

Fig : 6.1 Random nodes Selection

6.2 Random nodes Delay

The following figure defines the data transmission delay from source to destination.

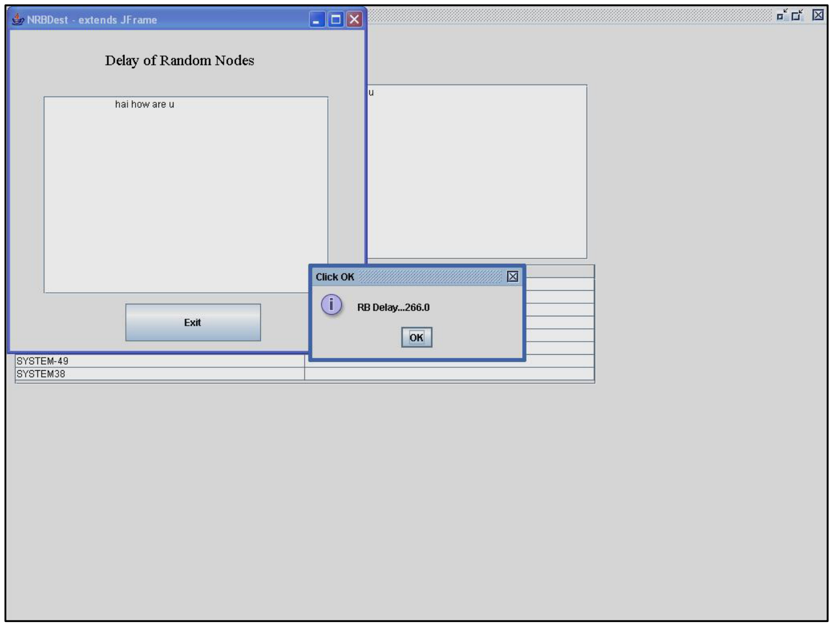

Fig: 6.2 Delays of Random Nodes

6.3 Non Random nodes Selection

The following figure define the how the Non random nodes are select in network

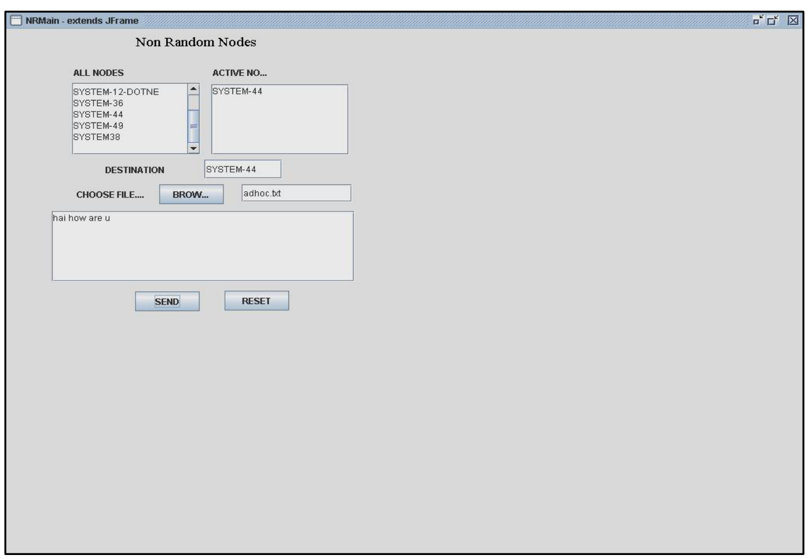

Fig: 6.3 Non Random nodes Selection

6.4 Non Random Nodes Delay

The following figure shows the delay of transmission between source to destination of Non Random Nodes.

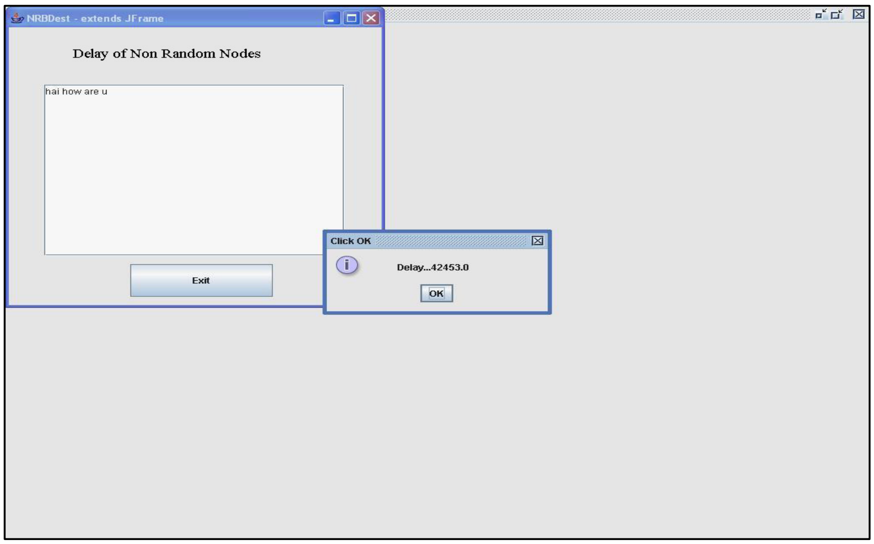

Fig: 6.4 Non Random Delay Nodes

6.5 Comparison of Random and Non Random Nodes

The following figure shows the the comparison of delay between the random nodes and random nodes.

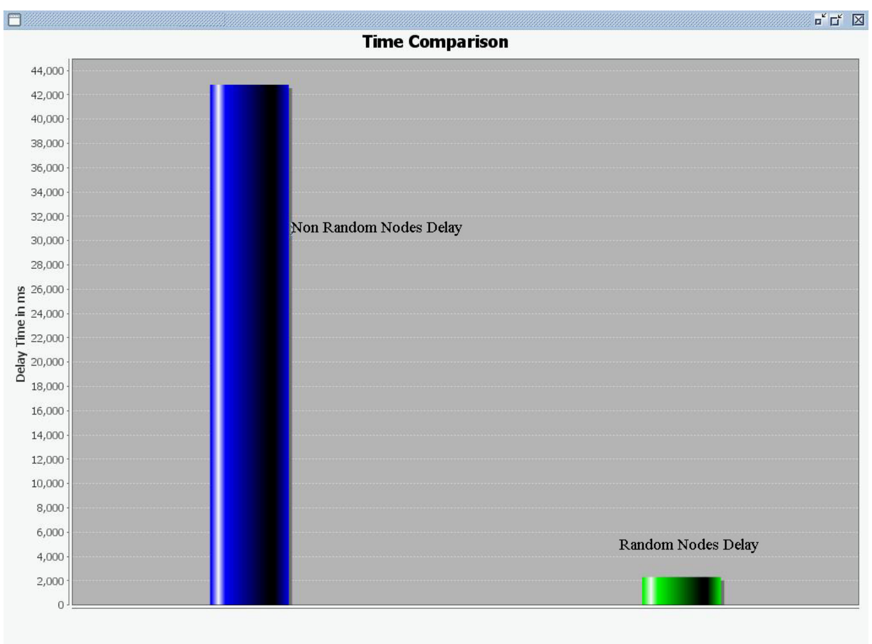

Fig: 6.5 Comparisons of Random and Non Random Nodes

7. Conclusion

The random waypoint model describe the how the data is transmitted in random and non random selected nodes in the mobility network. And also calculate the delay between the random nodes and non random nodes delay .it's solve the network problems and to avoid the traffic problems.

8. Future work

The future work of this model is to provide the security Mechanisms of data transmission.

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